

and the third lens element **403** having a second diameter. In other words, the first and second lens elements **401** and **402** have the same diameter, whereas the third lens element **403** has a diameter larger than that of the first and second lens elements **401** and **402**. Therefore, because the third lens element **403** has the smallest F number, a light spot formed by the third lens element **403** has the smallest size. Furthermore, the first through third lens elements **401**, **402**, and **403** are linearly disposed in a horizontal direction, when viewed from a rear, front, or surface of the image pickup apparatus **400**. In this example, the first lens element **401** is disposed on the left, the third lens element **403** is disposed in the center, and the second lens element **402** is disposed on the right.

[0071] Referring to FIGS. 4B and 4C, the first through third image pickup regions **411**, **412**, and **413** respectively corresponding to the first through third lens elements **401**, **402**, and **403** are disposed. Here, the first through third image pickup regions **411**, **412**, and **413** are logically divided regions in a single image sensor **410**. For example, as shown in FIG. 4C, in the single image sensor **410**, the first image pickup region **411** is a region divided to detect a light beam focused by the first lens element **401**, the second image pickup region **412** is a region divided to detect a light beam focused by the second lens element **402**, and the third image pickup region **413** is a region divided to detect a light beam focused by the third lens element **403**. In this case, the first through third image pickup regions **411**, **412**, and **413** may have the same pixel pitch.

[0072] The first through third image pickup regions **411**, **412**, and **413** may have different sizes from one another. In this example, the first and second image pickup regions **411** and **412** have the same first size, whereas the third image pickup region **413** has a second size smaller than the first size. To this end, an image processing unit of the image pickup apparatus **400** may split pixels in the image sensor **410** into the first through third image pickup regions **411**, **412**, and **413** and a dummy region, based on preset coordinates. Furthermore, the image processing unit may generate a first image by using only signals generated by the first image pickup region **411**, generate a second image by using only signals generated by the second image pickup region **412**, generate a third image by using only signals generated by the third image pickup region **413**, and ignore signals generated by the dummy region.

[0073] According to the exemplary embodiment, because the single image sensor **410** is used for the first through third lens elements **401**, **402**, and **403**, instead of using separate image sensors, an assembly process may be simplified, and fabrication costs may be reduced. The structure of the single image sensor **410** described above with reference to FIGS. 4A through 4C may also be applied to other exemplary embodiments.

[0074] FIG. 5A is a schematic diagram showing a structure of an image pickup apparatus **500** according to another exemplary embodiment, FIG. 5B is a schematic cross-sectional diagram showing an arrangement of first through fifth lens elements **501**, **502**, **503**, **504**, and **505** and first through fifth image pickup regions **511**, **512**, **513**, **514**, and **515** of the image pickup apparatus **500** shown in FIG. 5A, and FIG. 5C is a diagram showing sizes and pixel pitches of the first through fifth image pickup regions **511**, **512**, **513**, **514**, and **515** of the image pickup apparatus **500** shown in FIG. 5A.

[0075] Referring to FIG. 5A, the image pickup apparatus **500** includes a first lens element **501** having a first diameter, a second lens element **502** having a second diameter larger than the first diameter, a third lens element **503** having the second diameter, a fourth lens element **504** having a third diameter larger than the second diameter, and a fifth lens element **505** having the third diameter. In other words, the first lens element **501** has a smallest diameter. Furthermore, the second and third lens elements **502** and **503** have a diameter larger than that of the first lens element **501**, and the fourth and fifth lens elements **504** and **505** have the largest diameter. Therefore, the first lens element **501** has the largest F number, whereas the fourth and fifth lens elements **504** and **505** have the smallest F number. The first through fifth lens elements **501**, **502**, **503**, **504**, and **505** are linearly disposed in a horizontal direction, when viewed from a rear, front, or surface of the image pickup apparatus **500**. In this example, the first lens element **501** is disposed at the center, the second and third lens elements **502** and **503** are disposed at either side of the first lens element **501**, and the fourth and fifth lens elements **504** and **505** are disposed to be at the left end and the right end, respectively.

[0076] Referring to FIGS. 5B and 5C, the first through fifth image pickup regions **511**, **512**, **513**, **514**, and **515** respectively corresponding to the first through fifth lens elements **501**, **502**, **503**, **504**, and **505** are disposed. The first through fifth image pickup regions **511**, **512**, **513**, **514**, and **515** may have different sizes and pixel pitches from one another. In this example, the first through third image pickup regions **511**, **512**, and **513** have the same first size, whereas the fourth and fifth image pickup regions **514** and **515** have a second size smaller than the first size. Therefore, images obtained via the first through third image pickup regions **511**, **512**, and **513** have the same first angle of view, whereas images obtained via the fourth and fifth image pickup regions **514** and **515** have a second angle of view narrower than the first angle of view.

[0077] Furthermore, referring to pixels **521**, **522**, **523**, **524**, and **525** shown in FIG. 5C, the first image pickup region **511** has a first pixel pitch, the second and third image pickup regions **512** and **513** have a second pixel pitch smaller than the first pixel pitch, and the fourth and fifth image pickup regions **514** and **515** have a third pixel pitch smaller than the second pixel pitch. Therefore, the images obtained via the second and third image pickup regions **512** and **513** have higher resolutions than the image obtained via the first image pickup region **511**, and the images obtained via the fourth and fifth image pickup regions **514** and **515** have higher resolutions than the images obtained via the second and third image pickup regions **512** and **513**.

[0078] In the above-stated structure, an image having a first angle of view may be provided via the first lens element **501** and the first image pickup region **511**, images having the first angle of view may be provided via the second and third lens elements **502** and **503** and the second and third image pickup regions **512** and **513**, and images having a second angle of view may be provided via the fourth and fifth lens elements **504** and **505** and the fourth and fifth image pickup regions **514** and **515**. Furthermore, depth information of an image having the first angle of view may be extracted by using two images respectively obtained via the second and third lens elements **502** and **503** and the second and third image pickup regions **512** and **513**, and depth information of an image having the second angle of view may be extracted